



2000 Maintenance Symposium

Condition-Based Maintenance

Steve Butcher
Logistics Management Institute
steve_butcher@msn.com

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Condition-Based Maintenance

Conference Theme:

Integrating Aging and New Systems Maintenance

Track:

Condition-Based Maintenance

Track Theme:

A Snapshot of Service Initiatives





Condition-Based Maintenance

Background: LMI Reports to ADUSD on CBM

- 1st Report to DoD, August, 2000
Definitions, Technology Assessments
 - 4 Service CBM Programs
- 2D Report to DoD, October, 2000

Management Issues

- Have we thought through how to build a CBM system
- What are the goals of the programs?
- How do we measure success?
- Do we have adequate resources (funding) to achieve program goals?
- What kind of payback are we getting?



Condition-Based Maintenance

- Definition

- CBM **is** a set of maintenance actions based on real-time or near-real time assessment of equipment condition which is obtained from embedded sensors and/or external tests & measurements taken by portable equipment.

- Purpose

- OPNAV INST 4790.16, Condition-Based Maintenance (CBM) Policy, 6 May 1998

- “The **purpose** of CBM strategy is to perform maintenance only when there is objective evidence of need, while ensuring safety, equipment reliability and reduction of total ownership cost.”

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CBM Starts as an On-System Process

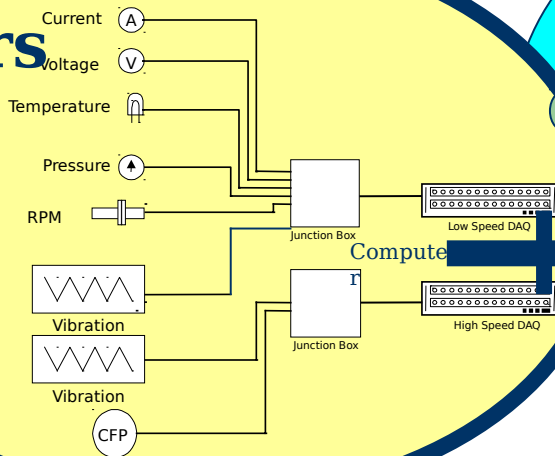
- Augmented by portable test equipment at O-level
- Supported by a computer network and database managed at I-level or above
- Part of an overall Integrated Diagnostics process at all levels



Condition-Based Maintenance

(On System) (At System) (Off System)

Embedded Sensors



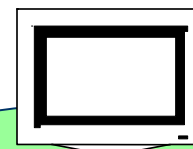
Data Bus

Portable Maint Aid



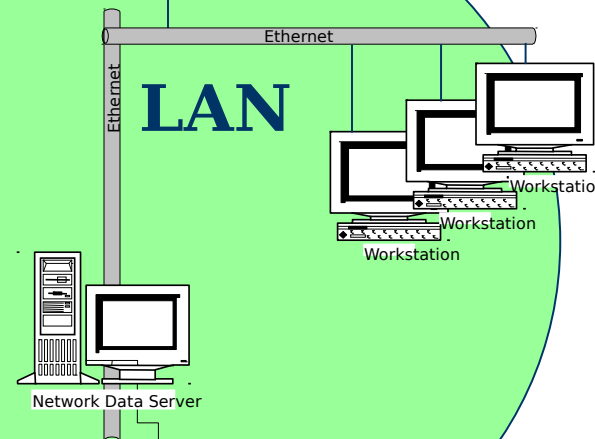
Computerized Maintenance Management System

Trend Data



LAN-connected Maintenance Workstation

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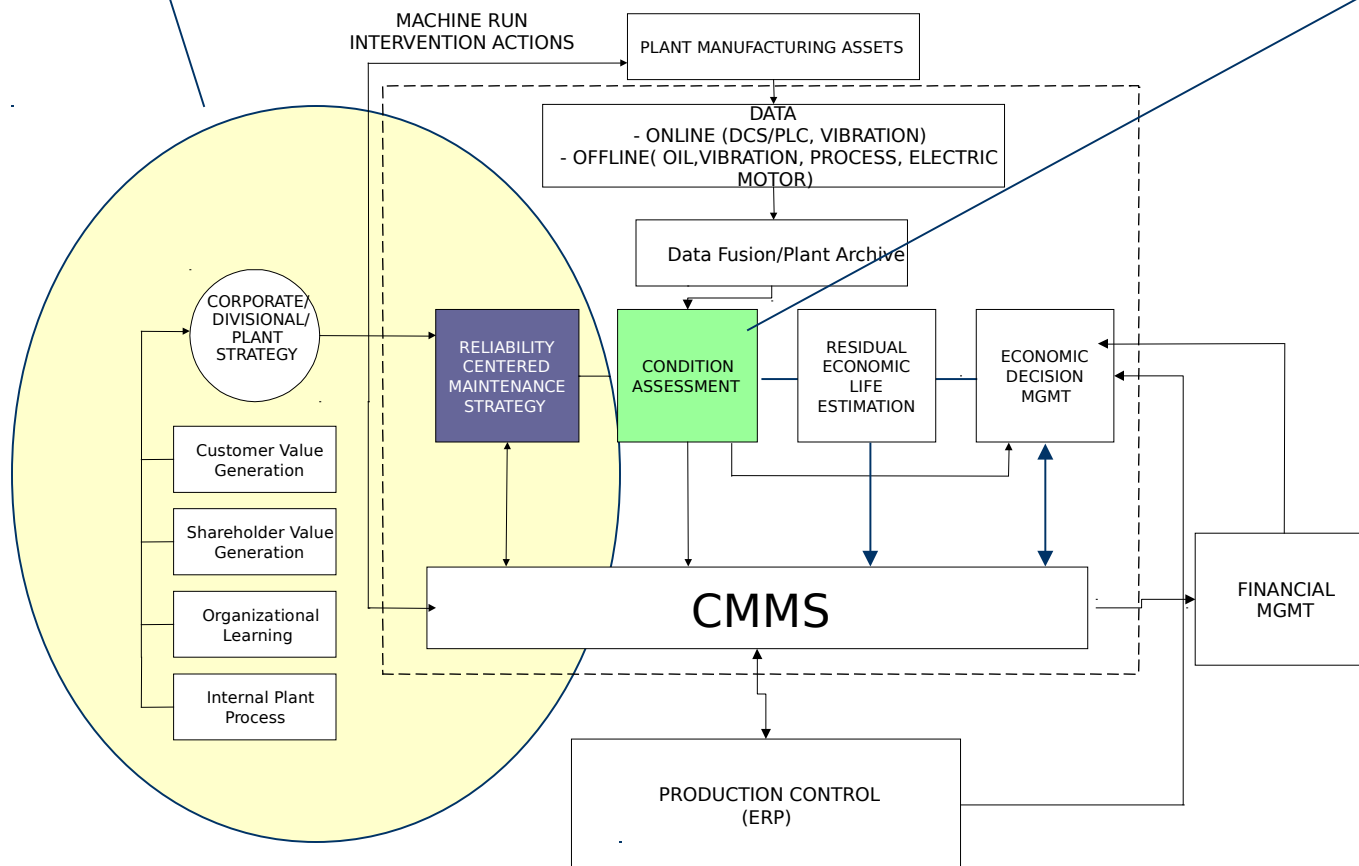
Data-base

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Maintenance Strategy Drives CBM (Commercial Example)





Condition-Based Maintenance

Forces Driving The Need for CBM

- Joint Vision 2010 & Focused Logistics
- Legacy [Process & Equipment] Problems
- Diminishing Resources



Condition-Based Maintenance

Joint Vision 2010 & Focused Logistics

- Requires a Re-Invention of Logistics & Maintenance Processes to Achieve the Vision

Achieving Anticipatory Maintenance is a Key Capability

CBM Enables Anticipatory Maintenance

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Legacy Maintenance Process Problems

Existing preventive maintenance programs in the Military, many derived decades ago, have these characteristics:

- High Cost, Labor intensive
- Perform unnecessary maintenance
- Don't prevent catastrophic failure
- Have high rates of CND / RTOK / NEOF

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CBM Can Mitigate These Problems



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Legacy Equipment Problem:

Our Systems Are Old and Expensive to Maintain

- 75% of USAF aircraft are > 20 yrs and will be in the field for at least 10 more years
- The average age of USN aircraft is 17 yrs
- The submarine fleet service life is 33-42 years
- Ground fighting vehicles have been in the field >20 yrs

Retrofitting CBM to Legacy Systems is Critical
And the Major Challenge Ahead of Us

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Today's Presentations

- Ken Jacobs, Director, RCM, NAVSEA
 - NAVSEA Initiatives in RCM/ CBM
- Pat Stevens, Deputy PM, Army PM-TMDE
 - Army Diagnostic Improvement Program (ADIP)
- Andy Hess, Branch Chief, NAVAIR
 - Joint Strike Fighter Prognostic Health Management System (JSF PHM)